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Public policy and retirement saving incentives in the UK

by

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Abstract

With ageing populations, OECD governments are searching for policies to increase retirement incomes. The UK government has introduced a series of policies, including the introduction of Personal Pensions from April 1988, of Stakeholder Pensions from April 2001, and the planned introduction of a National Pensions Saving Scheme (NPSS), designed to encourage individuals to save in retirement accounts rather than relying on state provision of social security in old age. These changes have been accompanied by changes in the tax treatment of private pensions. Arguably, the frequency and complexity of these reforms heightens the difficulties that households face in implementing consistent lifetime saving strategies. We examine some of these reform episodes in order to discover how households responded given the micro-incentives implied by this sequence of reforms – in particular those arising from the introduction of Personal and Stakeholder Pensions.

Key words: Retirement saving pensions

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Public policy and retirement saving incentives in the UK

1. Introduction

How can governments encourage households to save for retirement? In the United Kingdom (UK), many households rely on private pensions rather than social security for much of their retirement income (see Johnson, Stears and Webb, 1998, and Banks *et al*, 2002, 2005). Given the importance of retirement saving in the UK, there has recently been well-publicised concern as to the extent of a 'savings gap' between how much working age individuals should save for retirement and what they actually save (Pensions Commission, 2004). There is not much agreement in the literature however as to *what* policies work in enhancing retirement saving and what policies do not. The prolonged debate around this question in the United States (see, *inter alia,* Bernheim and Scholz, 1993; Poterba, 1994; Journal of Economic Perspectives, 1996; and Attanasio and DeLeire, 2002) has led to no agreed conclusions. There is very little evidence for the UK on the issue despite the plethora of recent UK reforms of both the pension and the tax regimes covering retirement saving.

Economists point to the difficulties that households face in making the consistent, cognitive choices that are required to engage in what Diamond (2004) terms 'adequate preparation' for retirement (rather than, more narrowly, 'adequate saving'). Recent evidence for the UK suggests that individuals have relatively low levels of basic financial numeracy, that these levels decline with age, and that lower financial numeracy is associated with lower levels of pension coverage even when we control for other measures of cognitive ability, wealth and education (Banks and Oldfield, 2006). Leaving aside the broader question of whether such deficiencies provide a rationale for greater public provision of social security (as opposed to policies aimed at improving individuals' abilities to plan their own finances), there is the narrow question of whether individuals understand, and therefore respond to, changes in retirement saving incentives. This is an important issue for policy-makers. Indeed, much of the debate in the United States around the interpretation of evidence on household responses to changes in retirement saving incentives has implicitly reflected the contrasting views of researchers as to whether households are broadly making lifetime-consistent choices or whether limited cognitive functioning leads to the use of 'rules of thumb' or other potentially time-inconsistent saving strategies.

Limited cognitive abilities of would-be savers have been adduced as a reason for greater prescription of household saving behaviour by the government – underpinning, for example, the case for defaulting individuals into a private pension plan rather than relying on individuals making active decisions to save for retiement, as proposed in the UK in the government's recent White Paper (Department for Work and Pensions, 2006) in the light of the recommendations of the Pensions Commission (2005). Some proponents of government intervention to regulate retirement saving levels have a tendency to see the government as the benevolent non-myopic agent that is able to formulate 'rational' policies to provide adequate retirement incomes in the face of the time inconsistency, myopia or other cognitive failures of households. Indeed, in an extreme version of this hypothesis, households may actively vote for a government with retirement policies (such as design of social security programme or tax regime) that reflect the intertemporally consistent preferences of the median voter when that voter knows that he or she will be temporally inconsistent in their own saving behaviour (Cremer *et al*, 2006).

But this is an implausible argument. As Diamond (2004) states: "…the political process is not equivalent to a consistent approach to policy over time (which, it seems to me, is an essential property of democracy given divergent preferences and views)…" (p.5). If public retirement policies are themselves temporally *in*consistent (and this fits in well with the central strand of macroeconomic theory which starts from the premise that governments have strong incentives to behave in an inconsistent manner), then the difficulties facing households that are attempting to adopt time-consistent retirement strategies are heightened. Or, to put the point a different way, a retrospective analysis of household behaviour that suggests that households have failed to prepare adequately for retirement may simply reflect past public policy failures rather than cognitive failures by households.

The United Kingdom offers an interesting case study of this issue. There has been a plethora of policies in recent years designed to broaden the fraction of households actively saving for retirement and also to raise the amount of retirement saving per household. Some of these policies are summarised in the next section of the paper. This UK retirement policy trajectory has not always been consistent over time, and it is thereby hardly surprising that saving outcomes also appear, to the retrospective observer, time inconsistent and/or lacking any sense of 'rational' behaviour. But this

may primarily reflect the inevitably inconsistent approach to policy over time described by Diamond rather than cognitive failure.

To investigate these issues further, and having described the main changes to the policy regime in the next section, we focus on two policy 'experiments' that occurred in UK retirement saving policy in the last two decades. The first is the introduction of Personal Pensions from April 1988, the second the introduction of Stakeholder Pensions from April 2001.

The case of Personal Pensions is discussed in Section 3 of the paper. To summarise that section: Personal Pensions are individual retirement accounts with insurance companies that, when introduced, provided generous incentives to individuals differentiated by age group. Standard actuarial calculations suggest that in order to offset the effects of compound interest and make the incentive to save in a defined contribution pension approximately equal for all individuals, incentives should be skewed towards older individuals. However, the incentive structure that was implemented effectively geared incentives towards younger individuals, perhaps reflecting the view that younger households had short time horizons and therefore did not prioritise retirement saving. The outcome in terms of take-up (and also after the government changed its policy in the mid-1990s) is described in that section.

In Section 4 we discuss the introduction of Stakeholder Pensions from April 2001. These were 'no frills' individual retirement accounts and employers with more than five employees who do not offer other private pension provision are obliged to nominate a stakeholder pension for their workers. They were designed to overcome some of the difficulties arising from the charging structure of Personal Pensions, which were believed to lead to excessively high charges, and were again intended to increase the proportion of households actively saving for retirement. The policy was explicitly targeted on middle earners although a concurrent and less publicised change in the structure of incentives had a different incentive effect across the household income distribution. We describe these changes and show how the responses of households in terms of increased take-up of private pensions reflected these various changes in incentives.

Section 5 draws together the evidence from these case studies. In summary, it is impossible to say whether the evidence supports the proposition that households have fully understood and temporally consistent retirement saving plans. Indeed without a

benchmark of optimality derived from a sophisticated structural calibration exercise drawing on parameter values from empirical studies of retirement saving in the UK, it is hard to know what 'optimal' household saving would be like in the UK (for analysis of this kind for the US see Scholz, *et al,* forthcoming). What *is* clear from these case studies, however, is that a significant number of households appeared to understand the 'true' incentives arising from these policy experiments, possibly rather better than the policymakers themselves as in both the cases of Personal Pensions and Stakeholder Pensions, the outcomes appeared at odds with the professed aims or targets of the policies themselves. At the very least, these results suggest that we should err on the side of caution in asserting that policymakers in government have superior knowledge to households as to what should be the 'optimal' behaviour of the latter in the context of retirement saving.

2. Retirement saving policy in the UK: A brief survey

2.1. *The structure of pension arrangements*

Historically, UK retirement pensions have derived from two sources: publicly-provided social security, composed of a 'flat' contributory or means-tested benefit supplemented by an earnings-related component introduced in the late-1970s, and company-provided defined benefit (DB – i.e. where the benefit is defined as a function of earnings, often final salary) occupational pensions. The introduction of the earnings-related component to social security from April 1978, known as the State Earnings-Related Pension Scheme (SERPS), provides one test of the impact of the changing policy regime on retirement saving behaviour since accrual rates in this new pension regime were cohort-specific. Attanasio and Rohwedder (2003) exploit this cross-cohort 'experiment' to measure a significant offset between public pension provision and private retirement saving.

In the early 1980s, the Thatcher administration became increasingly concerned with the future costs of the social security programme, and initiated a programme of cutbacks in the generosity of both the flat and earnings-related components of the public programme. At the same time, the government was anxious to encourage greater retirement saving and sought to broaden the range of private retirement saving vehicles that attracted favourable tax treatment. From April 1988 it extended the facility for 'contracting out' (see the next sub-section) to allow defined contribution plans, whether provided by the employer or purchased as an individual retirement account from an

insurer (a 'Personal Pension'), to replace the earnings-related state benefit, SERPS. There were also changes in tax reliefs and other arrangements that are described in the next sub-section.

'Personal Pensions' generated a good deal of controversy, primarily because they were perceived as having excessive administrative charges and because 'mis-selling' led some individuals to leave their high-quality private DB plans and purchase more risky DC plans instead. They also, as will be shown in Section 3, proved extremely financially costly to the government, which reversed its policy of generous tax reliefs on Personal Pensions in the mid-1990s. This immediately dampened demand for Personal Pensions.

The incoming New Labour administration, having promised a 'fundamental' welfare reform in 1998 then decided to introduce a new category of Personal Pension, the Stakeholder Pension, from April 2001 – the differences from standard Personal Pensions are described in Section 4 – along with a host of changes to the social security regime. However even these changes were deemed inadequate and a series of critical reports led to new proposals for both social security and private pensions in 2005. Fundamental changes to the tax treatment of pensions have also occurred between 2001 and 2006 that will be described where appropriate.

2.2. *Tax reliefs and 'contracting-out'*

In the UK programme, there are two forms of implicit subsidy to retirement saving: first, the tax treatment of contributions to private pension schemes, and second, the system by which private pensions may 'contract-out' of part of the social security programme. Each needs a brief explanation to motivate the ensuing discussion of changes to retirement saving vehicles and tax changes.

The UK tax treatment of retirement saving has historically been broadly 'EET': that is contributions to pension schemes are tax-exempt up to a ceiling, accrued returns to funds were partially tax-exempt (although this has been curtailed by the removal of tax credits on equity dividends in 1997), and pensions are taxable in payment other than a tax-free lump sum (although this too was capped in the late 1980s). Relative to other forms of investment, pensions have historically been somewhat less favourably treated than owner-occupied housing and more favourably treated than investment in financial assets. However, these differentials have eroded over time – for further details, see

Dilnot *et al* (1994), Emmerson and Tanner (2000), Booth and Cooper (2002) and Leicester and Oldfield (2004).

For employer-provided defined benefit (DB) plans, the cap on tax relief effectively took the form of a cap on the final value of the pension that could be provided by an approved plan, since contribution rates must be actuarially adjusted to achieve the target benefit given the return on the pension fund. In defined contribution (DC) schemes, in contrast, the tax relief ceilings have taken the form of age-specific limits on the value of contributions that are eligible for tax relief. We discuss changes to these limits in greater detail in the context of the introduction of Stakeholder Pensions from April 2001 in Section 4. In April 2006, a major attempt was made to simplify this complex system of reliefs such that individuals can contribute up to the value of their gross earnings (up to an extremely high annual cap set at £215,000 in 2006–07) to a pension each year as long as the total value of their pension fund or funds (whether a DB or DC plan) does not exceed a lifetime limit set at £1.5 million in 2006–07, set to rise annually reaching £1.8 million in 2010–11.

A second important feature of the UK pension programme is that private pension schemes can 'contract out' of the earnings-related tier of the public programme. Originally, when only defined benefit company pension plans were approved for contracting-out, the private plan would take over responsibility from the state for paying an earnings-related pension to its retired members – this was known as the 'Guaranteed Minimum Pension' – and in exchange the employer and employee would pay lower social security contributions to the government. Obviously the government would wish approximately to balance the present value of forgone contributions against its gain in lower social security benefit payments in the future, although since individual pension funds were not 'risk-rated' (by, for example, the ratio of prospective contributors to pensioners), this contracting-out arrangement subsidised the typical company's pension plan (Dilnot *et al*, 1994).

As mentioned earlier, in the late 1980s the government decided to encourage private provision of retirement saving vehicles by also permitting defined contribution plans to 'contract out' of the earnings-related tier of the social security programme. These DC plans could be employer-provided or provided as individual retirement accounts by insurers – the latter, which initially dominated DC provision, are known as 'Personal Pensions'. The key feature of the contracted-out 'Personal Pension' is that the

value of the rebate of social security contributions is paid directly through the Department of Work and Pensions (previously Department of Social Security) to the pension provider on behalf of the individual. This minimises the administrative cost of the contracting-out arrangement although of course providers may (and did) exact a charge for managing the whole account. A typical retirement contract might include additional saving by the individual and possibly his or her employer. Such additional saving might in the future be affected by recent proposals (see Department of Work and Pensions 2006) that would mean that individuals and their employers would make contributions to a private pension unless the employee actively chooses to opt out. We do not assess this proposal in the current paper, but the implications of the combination of rebate structure and tax reliefs that existed when Personal Pensions were introduced in our analysis in the next section have relevance to this proposal.

2.3. *Policy 'experiments'?*

It is apparent from this all-too-brief run through UK pension policy that there have been numerous policy 'experiments' implemented. The informational requirements for the 'rational' saver of any one regime are daunting, without even considering whether households could anticipate the trajectory of reform that actually unfolded. Unfortunately, for the researcher into household behavioural responses, the sheer frequency of these changes and the paucity of micro-data make it difficult to track the effects of any one change. Hence, as described in the introduction, we examine two episodes in some detail in order to examine individual behavioural responses to changes in tax and retirement saving regimes.

It should also be noted – and this turns out to be important for our analysis of Stakeholder Pensions in section 4 – that the basis of the personal tax system in the UK is the individual, so that household optimisation will take account of individual tax relief entitlements and incomes. However both tax credits and means-tested benefits (which are important in the UK but are less central to the analysis here) are assessed on a family basis. We do not consider in detail the interaction between individual retirement saving and household-assessed entitlements to means-tested benefits here, although the issue will be mentioned again in Section 4.

3. Personal Pensions

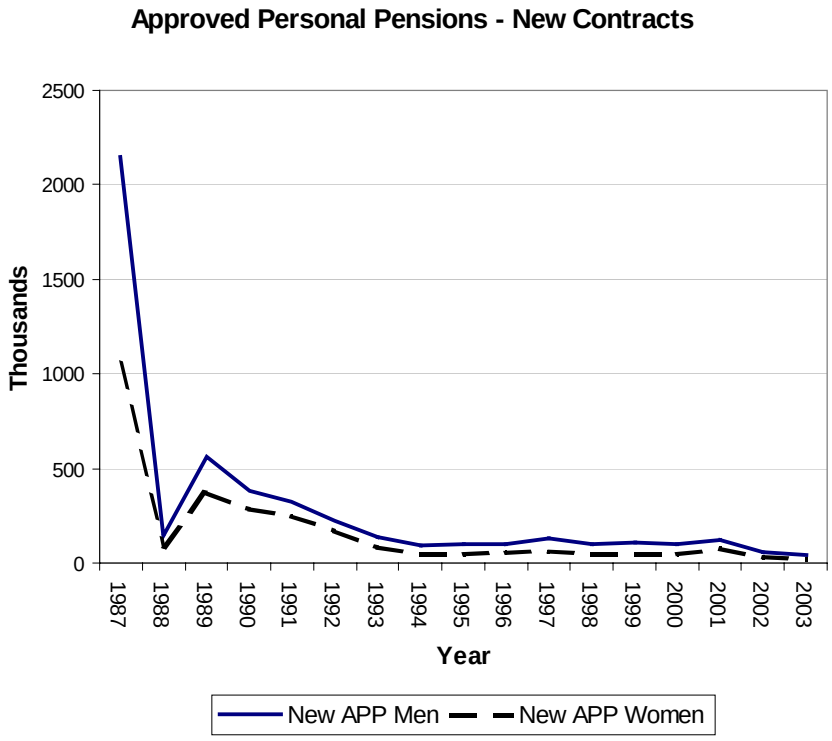
3.1. *The introduction of personal pensions*

From April 1988 individuals in the UK were offered the possibility of 'contracting-out' of the State Earnings-Related Pension Scheme (SERPS) into an Approved Personal Pension (APP) (and this could be backdated to April 1987). As mentioned in Section 2.1, an APP is an individual retirement account offered by an approved insurer, in which an individual accumulates his or her pension contributions into a fund, the proceeds from which then had to be used to buy an annuity from an insurance company on retirement. The pension could be drawn at any age between 50 and 75, and this flexible date of annuitisation as well as the portability of APPs between employers suggested that such schemes would be particularly attractive to mobile workers inadequately covered by a company pension plan. In this section we describe the incentives to 'contract out' of SERPS and to purchase an APP, and illustrate the effects of these incentives on behaviour in a straightforward manner.

The then Conservative government saw greater choice of private pension arrangements as an essential ingredient in the desire to 'free up' the labour market by encouraging greater flexibility and portability of pension arrangements. In 1985, it argued that: "A major factor in the demand for personal pensions has always been that they should be fully portable. People must be able to take their own pensions with them without any loss when they change jobs. The Government are committed to ensuring that barriers in pensions do not affect job mobility" (Department of Social Security, 1985). The introduction of Approved Personal Pensions was seen as a central component to this strategy of greater labour market flexibility.

The Department of Social Security had used as a working assumption that half a million people would choose to contract out of SERPS and opt to put their contracted-out rebate of social security contributions into a Personal Pension, although a contingency plan allowed for up to one and three quarter million optants (Disney and Whitehouse, 1992). In the event, roughly six million new APP contracts had been approved by 1992, the bulk of them in the first year (see Figure 1).

Figure 1



The cost to the government of this mass exodus from the public pension programme, in terms of the reduction in public pension contributions arising from the transfer of contracted-out rebates to APP optants over the period 1988-1993, was estimated to be £9.3 billions in 1991 values. It was simultaneously estimated by the government's spending 'watchdog', the National Audit Office, that this would lead to a prospective reduction in future spending on public pensions (SERPS) of £3.4 billion (National Audit Office, 1991). Overall, this policy therefore represented a net cost to the government of almost £6 billion, labelled by the *Financial Times* on 4th January 1991 as 'The pensions débâcle'.

Why did this discrepancy between predicted take-up and actual take-up, which was so expensive to the government's finances, occur? Was it a cognitive failure by individuals (perhaps arising from a temporary 'fad', illustrated by the rapid decline in new contracts after 1992) or was it a forecasting failure by government? To understand this, it is useful to look at the incentives to individuals to purchase an APP, and in particular how these incentives varied across age groups. As described in Section 2.2, the key incentive to encourage take-up of Personal Pensions was that the government offered to transfer a proportion of the individual's social security contribution, known as the

National Insurance (NI) contribution, into their personal pension fund in return for the individual forgoing entitlement to the social security benefit, SERPS, on reaching pensionable age. The individual would forego the entitlements that would have accrued from the years in which they were 'contracted out' of SERPS, but it was always open for the individual to contract back in to SERPS at a later stage in their working life, thus retaining their Personal Pension fund whilst accruing SERPS entitlements for the part of their working life for which they paid full NI contributions.

To make this contracting-out attractive, the government set the rebate of NI contributions for people who opted into a Personal Pension at 5.8% of earnings between a contribution ceiling and floor. In addition, as an extra incentive to attract workers to opt out of SERPS, for individuals who were not already opted out into a company pension plan, an extra 2% point reduction in the NI contribution rate would apply from the staring date (1988) until April 1993. For anyone contracting-out before April 1989, this extra incentive was paid for the previous two tax years as a lump sum into his or her Personal Pension account. Taking account of tax relief on individual pension contributions, this payment by the government of 5.8%+2% in NI contributions plus tax relief was 'worth' 8.46% of eligible earnings (Disney and Whitehouse, 1992a), and even higher in the first year for those who chose to take advantage of the retrospective provision.

It is worth repeating the point in Section 2.2 that this 8.46% contribution by the government into any individual's APP involved no additional contributions by the individual (although any such contributions would also be tax relieved, as described in the next section) and the only cost to the individual was that by opting to receive this contribution rebate, they would forgo accruing any entitlements to the earnings-related social security benefit, SERPS, for the period during which they were opted out of SERPS. So, to understand the incentives involved for individuals to make this decision, it is necessary to value the prospective accrued value of their Personal Pension fund, relative to what those individuals would have obtained from the government 'investing' those contributions in SERPS.

Using data from successive Family Expenditure Surveys to derive life-time earnings profiles, and given the rules underlying SERPS accruals and alternative assumptions as to the return accrued by the Personal Pension account, Disney and Whitehouse (1992a,b) modelled the incentives for an individual to choose between

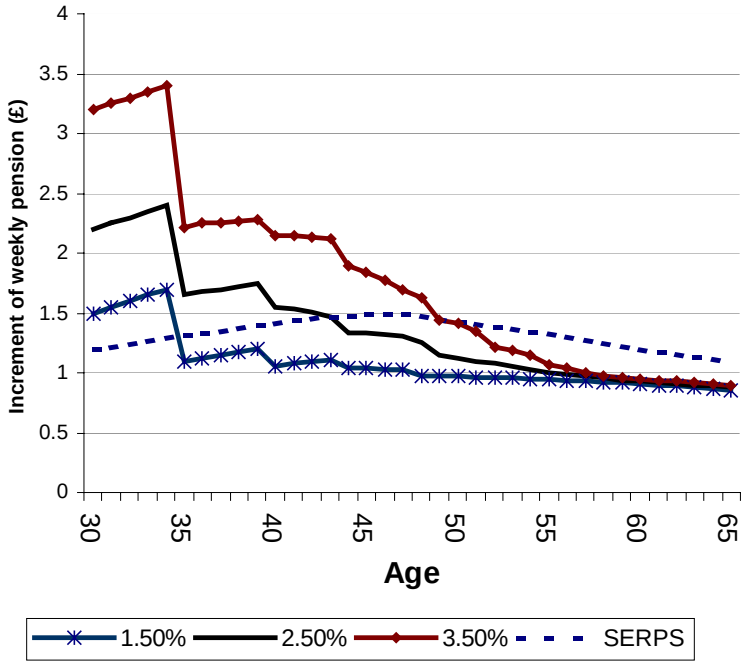
opting to buy a Personal Pension or to remain in SERPS. A key issue is that a funded individual retirement account such as an APP is broadly 'front loaded', in the sense that contributions made early in the working life compound in the fund over a longer period. In contrast, contributions to the unfunded public programme, SERPS, do not exhibit this feature – indeed normally one might expect DB pension accruals to be 'backloaded' in the sense that earnings rise over the life cycle and thus years of service at later, higher, earnings levels will increase pension accruals disproportionately. However, as in the US, social security calculations in the UK 'revalue' earnings earlier in the life in relation to an average earnings index – this serves to somewhat flatten the effective age-earnings profile in calculating incremental social security entitlements. Finally, in judging an appropriate rate of return for contributions to a funded APP, it should be noted that the Government Actuary's Department (2000) estimated that real yields on bonds for the period 1985-97 averaged 3.5% (average real returns on equities averaged 7.6% from 1963-99) and that commission charges on APPs averaged the equivalent of a one percentage point reduction in returns over the period after April 1988.

For each individual with heterogeneous age-wage profiles, the optimal strategy of choosing between an APP and SERPS varied given the incentives existent in 1988. Disney and Whitehouse (1992a) illustrate the incentives with several illustrative examples – Figure 2 provides the illustration for a man on the average lifetime earnings trajectory of a skilled worker. Applying the accrual rules for SERPS, the applicable rebate of National Insurance contributions and various assumptions as to the real rate of return on the APP fund *net of charges,* the year-by-year increment to the final value of the pension from each additional year's tenure in an APP paying different returns, and to SERPS, given the man's projected age-earnings profile, are plotted in Figure 2.

The age-earnings profile of pension increments in SERPS reflects the 'flattening' of the age-earnings profile arising from the revaluation of earnings in calculating SERPS accruals by an average earnings index. The different incremental profiles for the APP reflect different assumptions as to the net-of-charges real return on the fund. The discontinuities reflect future changes in the projected contracted-out rebate made by the Government Actuary's Department in the early-1990s. (In fact, as we shall see, the whole system of rebates was subsequently radically revised.) Figure 2 shows how the differential between returns from APP and SERPS is age-varying and, in particular that there is an enormous discrepancy between the returns to opting for an APP relative to remaining in SERPS at all but the lowest assumed rate of return for younger individuals

in the workforce. The 'cross-over' points between the SERPS profile and the various APP profiles under different assumed rates of return show that at the very conservative real return of 1.5%, this particular individual should opt for an APP, contract back in to SERPS at around age 35, at 2.5% at around age 43, and at 3.5% (the average return over the relevant two decades) at age 48 or 49. It is fair to say that these types of calculations were fairly well understood by financial advisors in this period although few individuals were able to make these actuarial calculations from 'first principles'.

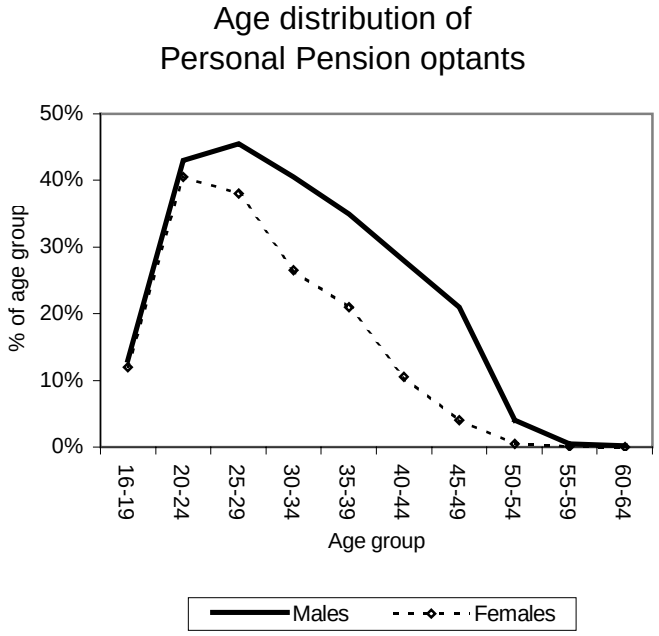
Figure 2
Annual increments to final pension age from purchase of Personal Pension (at 3 rates of return) versus SERPS



To understand how these incentives affected behaviour, no particularly sophisticated econometric strategy is required – we can simply look at the disparity in the age-related incentives to contract-out in Figure 2 and see whether these were mirrored in actual behaviour. Keeping in mind that younger workers had the greatest incentive to opt out of SERPS into an APP as demonstrated in Figure 2, Figure 3 illustrates the actual pattern of opting out of SERPS into an APP by age group, by measuring the age structure of the stock of Personal Pension optants as at 1992 from official statistics – the year before the contracted-out rebate was to be significantly reduced. It can be clearly seen that the age structure of APP optants clearly matches the pattern of differences in returns by age group between an APP and SERPS – moreover the fact that optants

extended into their late-40s suggests that individuals envisaged real rates of return of at least 2.5% per year on their funds. By way of a benchmark, over 40% of individuals in the younger age groups opted to switch in that short time interval between 1988 and 1992 – a dramatic change which confounds the often-asserted view that younger workers are unresponsive to pension incentives. It is striking that even a large number of 16-19 year olds opted into Personal Pensions – a group that even a standard life cycle model would suggest to have heavily discounted its future retirement income. It is likely that these were predominantly 'rebate only' optants who took the opportunity to invest the public rebate to their personal pension fund without making any additional contributions of their own.

Figure 3



3.2. *The reform of Personal Pension incentives in the mid-90s*

It is now apparent from combining Figures 2 and 3 why the introduction of Personal Pensions generated such a large net cost to the government – the overall incentives, especially to young people, to contract out of SERPS into APPs far exceeded the amount required to achieve the goal of increased private pension coverage, and a large number of individuals, particularly young people, responded to these incentives. Indeed, one reason why high commission charges (an oft-cited rationale for the 'failure' of Personal Pensions) failed to deter young people from buying Personal Pensions was that the excessively generous rebates to young people had effectively provided a 'rent'

that could be shared between purchaser and provider. This excess incentive stemmed from a forecasting error, resting on the apparent presumption that young people, in particular, were unresponsive to pension incentives unless these incentives were demonstrably large. This policy 'experiment' shows that consumers (perhaps via financial advisers) were however sufficiently financially adept as to understand these differential incentives, as indicated by the age structure of optants in Figure 3.

In the mid-1990s, therefore, the government set about rectifying the distorted incentive structure in the APP rebate regime. To understand this second 'policy experiment', it is necessary to refer back to Figure 2. This showed that the key problem with the APP rebate structure, given the 'frontloading' of returns to defined contribution pension plans, is that a flat rebate structure gave large windfall gains to younger APP purchasers. Even though the additional 2% rebate would end in 1993, a constant rebate rate by age gave an excessive incentive to young APP purchasers, whilst encouraging older APP purchasers to switch back into the public programme, SERPS. Thus an incentive structure based on the presumption that individuals broadly understood, and responded to, incentives rather than being intrinsically myopic and/or irrational, would structure the contracting-out rebate such that it would just give an incentive to a sufficient proportion of every age group to contract-out at some 'reasonable' rate of return whilst avoiding the intra-marginal gains arising from the existing rebate structure. This clearly implied that the contracted-out rebate for APP optants should *rise* with age so that for each age, there would be a 'neutral' contracted-out rebate that would just give the worker on median earnings (or any other earnings level, depending on the target rate of opting out by the government) an incentive to contract-out for any given expected rate of return on the Personal Pension fund.

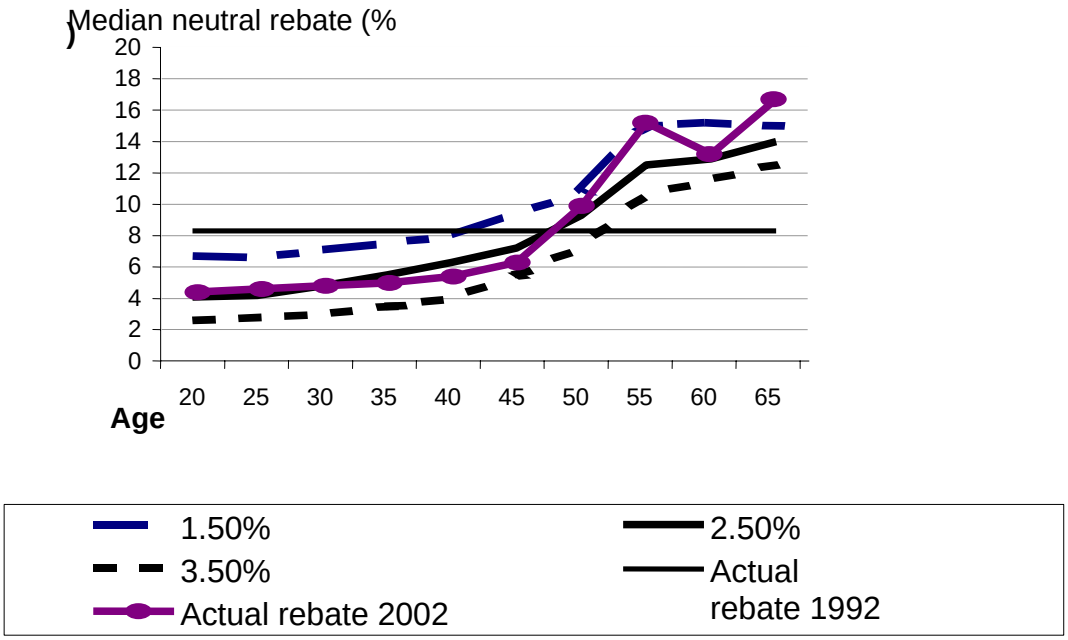
Such a structure was calculated in Disney and Whitehouse (1992b) (and further analysed in a more general framework by Palacios and Whitehouse, 1998). The 'neutral' rebate structure is illustrated for a man on median earnings in 1992 at various ages and by various prospective rates of return and is depicted in Figure 4. To illustrate, compared with the actual effective rebate rate of 8.46% (see previous discussion) – the horizontal line in Figure 4 – the rebate rate required to persuade a 20 year old man on median earnings to contract-out of SERPS into an APP would be under 7% at a return of 1.5% p.a falling to less than 3% at a rate of return of 3.5%. This would rise to, respectively, 11% and 7% by age 50. By structuring incentives in this manner, the government could in principle obtain a target rate of contracting-out at much less cost to the public

finances, changing the level of the average rebate to be higher when prospective real returns were lower (and vice versa) and also adjusting the rebate level to ensure a target rate of opting-out.

In 1997, the government switched policy and introduced age-related rebates. The actual rebate structure as it operated in 2002 is illustrated, and this age-related rebate structure appears to be consistent with the government assuming that real returns would continue to exceed 2.5% per annum (for further discussion of the assumptions, see the Government Actuary's Department, 2000). At one level, one can applaud this policy as an 'evidence-based' reversion to policymaking based on the presumption that individuals responded to retirement saving incentives. At another level, it also provides a further test of individual responses to changing retirement saving incentives since, if the new rebate structure eliminated any age-specific differences in the incentive to opt out, the discrepancy in opting-out rates by age illustrated in Figure 3 should be eliminated.

Figure 4

Median Neutral Contracted-out Rebate by Age and Real Rate of Return



This last hypothesis is illustrated in Figure 5 using data on APP *commencements* (that is, new APP contracts) from 1987–88 to 2003–04 using data from Department of Work and Pensions (2005). Both men and women are included, since they faced the same structure of rebates (although the incentives are slightly different insofar as women could draw their state pension somewhat earlier – however differential longevity is not

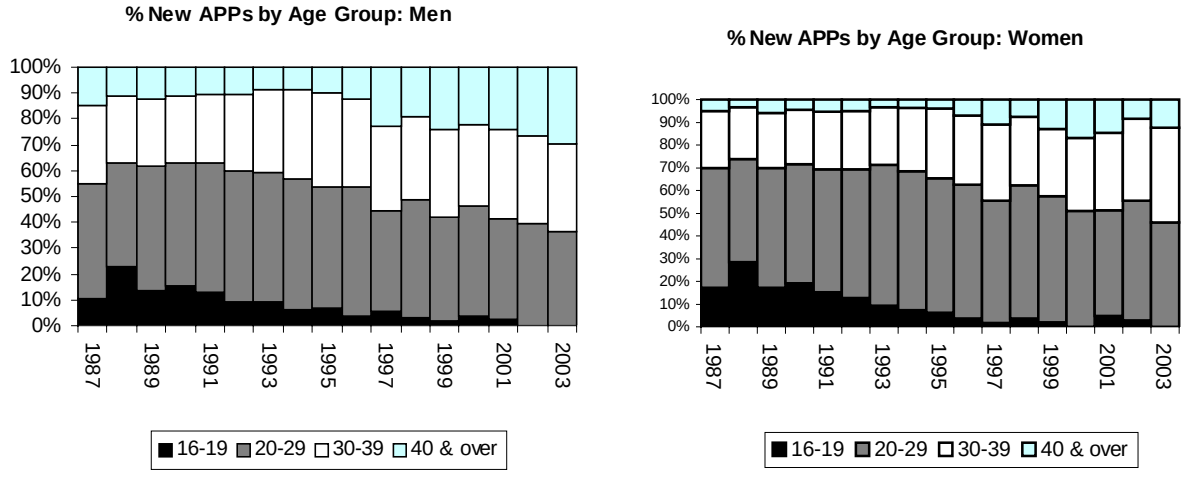
pertinent since the rebate component of the annuity is required to be 'gender-neutral' i.e not priced to reflect differential expected longevity by gender). Subject to any change arising from the introduction of Stakeholder Pensions (which is discussed in next section) we might expect to see a gradual 'levelling-out' over time in the proportions of different age groups opting for APPs as the age-related rebates eliminated the differential incentive for young people to opt out (and indeed for older people to revert to, or remain in, SERPs), although one might think that new optants might primarily come from new labour market entrants over time.

As Figure 5 illustrates, the early years saw APP optants being drawn primarily from young age groups (as also depicted in the stock estimate in Figure 3) but, by the end of the period, optants were drawn almost equi-proportionately from all age groups, for both men and women, as the restructuring of incentives would suggest. In fact, after 1997, when the rebate structure changed, there is some visual evidence that the proportion of older new optants jumped, exactly as the change in relative incentives would predict, although the difference in total numbers is relatively small. Again, no formal econometric technique is required clearly to illustrate the impact of this regime change on behaviour.

Figure 5

Approved Personal Pension Contract Commencements 1987–88 to 2003–04 by Age and Sex

(note: includes Stakeholder Pensions after 2001)



This introduction of age-related contracted-out rebates set the incentive structure on an appropriate economic basis. However, as real returns on equity funds and long term bond rates declined in the late 1990s, Approved Personal Pensions became less popular. New saving instruments not specifically targeted at retirement, such as Personal Equity Plans, Tax Exempt Special Saving Accounts (TESSAs) and Individual Saving Accounts (ISAs), were increasing in popularity. Moreover, and not surprisingly given the large effective public subsidy given to Personal Pensions, the net addition to aggregate retirement saving over and above government subsidies arising from Personal Pensions was probably rather small throughout the 1990s (for evidence, see Disney, Emmerson and Wakefield, 2001 and Disney, Emmerson and Smith, 2004). This led the government into another rethink of retirement saving, leading to the introduction of Stakeholder Pensions from April 2001, the analysis of which forms the basis of the next section.

4. Stakeholder Pensions

4.1. *The rationale for Stakeholder Pensions*

One of the lessons of the Personal Pension 'experiment' is that across-the-board tax incentives give large, intra-marginal, subsidies to particular groups. Indeed, as far as net saving is concerned, the wealth effects from these subsidies might outweigh any marginal incentive effects arising from the tax change. An alternative strategy is to develop saving instruments targeted specifically at groups in the population with inadequate retirement saving. The rationale for introducing new instruments is presumably that, for one reason or another, existing instruments are insufficiently attractive to the target group.

In this section, we consider a reform that embodied both these policy strategies of tax relief and targeting at a particular group: the introduction of Stakeholder Pensions in the UK in 2001. The Green Paper (Department of Social Security, 1998) which proposed Stakeholder Pensions argued that existing provision of private pensions was inadequate in significant respects – employer-provided pension plans predominantly covered only high earners and public sector workers whilst Personal Pensions, given their high upfront administrative charges, were also seen as most suitable for persistent and higher income savers. It argued that:

> "People on middle incomes want to save more for retirement but current pension arrangements are often unsuitable or expensive. Our new secure, flexible and value-for-money stakeholder pension schemes will help many middle earners to save for a comfortable retirement." (*ibid*, p. 48)

The Green Paper defined 'middle earners' as those individuals earning between £9,000 and £18,500 per annum. Although 'stakeholder' pension schemes were open to everyone, it was assumed that this target group were most likely to take-up the new retirement saving instrument. Many high earners, as mentioned, had access to other retirement saving instruments, whereas low earners were assumed to be better off contracted in to the public second tier pension (the State Earnings-Related Pension Scheme, SERPS, superseded in April 2002 by the more redistributive State Second Pension, S2P), rather than opting for a private pension arrangement.

The Green Paper also proposed a number of other changes to the pension regime, including a reform to the structure of tax reliefs that was also subsequently implemented. As mentioned in Section 2.2, employee contributions to retirement saving accounts in the UK obtain tax relief against income tax up to a ceiling of earnings (the UK direct tax system is individual-based). Until the advent of Stakeholder Pensions, the ceiling was proportional to earnings and more generous for older individuals. An important difference between the post-Stakeholder Pension tax regime and the previous tax regime is that *all* individuals, irrespective of any earnings, are able to make gross contributions of up to £3,600 a year to their private pension (whether it be a stakeholder pension or another form of private pension). This change in tax reliefs, as we illustrate in the next section, disproportionately affects low and zero earners. Those with very low earnings would need a source of resources in order to save in a pension, and the Green Paper noted one possibility:

> "The changes will also make it easier for partners to contribute to each other's pensions, again within the overall contribution limits, should they choose to do so." (*ibid,* p.63)

The introduction of Stakeholder Pensions therefore provided both a visible targeting of a new retirement saving instrument on a specified group and a change in the tax regime for pensions; the latter less publicised at the time but having a potential impact on retirement saving incentives for certain groups.

Unlike Personal Pensions, which had an immediate albeit controversial impact, the general perception in the UK finance industry is that the introduction of Stakeholder Pensions has been a disappointment, with low initial sales of this product and a decline in overall take-up of private pensions since 2001. In fact evidence from the Department of Work and Pensions itself (Department of Work and Pension, 2003) suggested little evidence of take-up or interest in the new product amongst the target group of middle

earners who did not have an existing private pension. Although the number of holders of Stakeholder Pensions exceeded 1 million by late-2002 (compare this with the 4 million new optants for Personal Pensions in the first year illustrated in Figure 1), many of these new pension arrangements seem to have arisen from individuals switching from other schemes (notably Personal Pensions) and from existing Group Personal Pensions being reconstituted as Stakeholder Pensions. This perception led to lobbying for further changes to the private pension regime (e.g. Association of British Insurers, 2003) and to a well-publicised officially-sponsored report suggesting the need for an alternative approach that defaulted individuals into a private pension plan in order to encourage retirement saving (Pensions Commission, 2005).

Aggregate statistics may suggest that the reform had little effect on coverage, but of course overall trends may conceal differential effects across sub-populations. Of particular interest are the impact on coverage among the targeted group of middle earners, and the impact, if any, of the change in the structure of tax reliefs. Adverse common trends in overall private pension coverage may have dominated any 'Stakeholder Pension' effect, and we might not rule out the possibility that any aggregate downward trend in pension coverage might have been even greater had Stakeholder Pensions not been introduced. However, to uncover any differential effect across groups requires a rather more sophisticated empirical strategy than that utilised in Section 3.

Specifically, therefore, this section estimates the impact of the introduction of Stakeholder Pensions on the proportion of households that have a private pension. We do not consider the impact of Stakeholder Pensions on the *volume* of retirement saving in this paper because of limitations in both household and aggregate data on the magnitude of retirement saving. We show that there was a take-up response to Stakeholder Pension, although this is concealed in the aggregate data. Differential changes in coverage across income groups emerge, exactly as an analysis of a targeted policy might suggest. But we show that these differential effects are not along the lines predicted by the 1998 Green Paper, namely an increase in take-up among middle earners. Our results suggest that it is low earners rather than middle earners who have responded to the introduction of Stakeholder Pensions, offsetting an overall declining trend in the probability of retirement saving among the rest of the population, including middle earners. It is these conflicting trends that are concealed by the 'no change' (in fact, slight decline) in the aggregate.

Why is it that increased private pension coverage among *low* earners offsets the aggregate change, rather than changes in coverage among the middle income group targeted in the Green Paper? We show why by modelling the effect of spouse's earnings on the probability of an individual's take-up of a private pension in this Section. We suggest that it was the changes in tax limits which allowed households to reorganise their saving strategy to take advantage of the new structure of tax reliefs that had an impact. In contrast, the simultaneous 'highlighting' of targeting on middle earners in the Green Paper had no significant effect on the probability of take-up of private pensions.

4.2. *Stakeholder pensions: brief description*

Stakeholder pensions were proposed in the Green Paper *Partnership in Pensions* (Department of Social Security, 1998), and after some revisions in the light of consultation, introduced from April 2001. Rhetorically targeted at people earning between £9,000 and £18,500 a year who did not already have a private pension, Stakeholder Pensions were intended primarily to increase the level of private pension provision among that group. Like all personal pensions, and some occupational pension schemes, Stakeholder Pensions are 'defined contribution' schemes, in that pension benefits depend on the accumulated value of the fund. They differ from Personal Pensions, however, in having compulsory minimum standards, a different governance structure, guaranteed workplace access for those working for moderate or large employers, and a simpler and more uniform charging structure.

Since 2001, companies employing at least five people that do not offer occupational pensions are required to: nominate a Stakeholder Pension provider after consultation with employees; provide employees with information on Stakeholder Pensions; and, channel employees' contributions to the nominated pension provider. Neither employees nor employers are compelled to contribute to a Stakeholder Pension and indeed firms employing less than five people were completely exempted from the requirement to nominate a provider. Stakeholder Pensions have a simple charging structure: an initial annual cap on charges was set at 1% of the fund, with no charges either upfront or on withdrawals from the fund.[1] Moreover, contributors can start and stop contributing at any time and schemes have to accept all contributions of £20 or more. Compulsory minimum standards are intended to provide a greater degree of

[1] In 2004, after lobbying from the finance industry, the Treasury increased this charge cap from 1% to 1½% for the first 10 years that a product is held. For more details see HM Treasury (2004).

uniformity between Stakeholder Pensions offered by different pension providers than previous pension arrangements. By making pension providers offer a relatively uniform product it was hoped that there would be less need for individuals to seek independent financial advice before taking out a Stakeholder Pension.

Evidence from the financial industry suggests that *new* take-up of Stakeholder Pensions, even among the target group of middle earners, has been rather limited. British Household Panel Survey (BHPS) data also show that, even before the introduction of Stakeholder Pensions, take-up of private pensions among the target group was substantial, with around 80% having some form of private pension in 2000 (see Disney, Emmerson and Tanner, 1999, for similar evidence from the early 1990s, well before the reform was announced). The BHPS also suggests that, among middle earners in 2000, those who *did not* have a private pension were more likely to have experienced a period out of employment over the previous 9 years and when in work, on average, had lower earnings than those with a private pension. Median liquid financial assets in 1995 were just £300 among those without a private pension in 2000 compared to £1,400 among those with a private pension. Not only was the Stakeholder Pension target group relatively small, but the characteristics of those middle earners might well suggest that, if they could afford to save more, they would be better advised to save in a more liquid form for precautionary purposes rather than saving in a private pension.

4.3. *Contribution ceilings*

A feature of the Stakeholder Pensions reform that was less discussed at the time, but which turns out to be rather important, lies in the change to contribution ceilings relative to those that applied to defined contribution retirement saving instruments such as Personal Pensions before April 2001. Employee contributions to Stakeholder Pensions are made net of tax, with the government then contributing the equivalent basic rate tax to the individual's scheme. Higher rate taxpayers can go on to claim more relief in line with their higher marginal income tax rate. Returns are broadly tax-exempt and pensions are then taxed at withdrawal except for up to 25% of the fund which can be withdrawn tax-free. These aspects of the tax regime broadly followed the existing regime for Personal Pensions, which also allowed tax-relieved contributions up to a maximum of earnings differentiated by age, as depicted in Table 1:

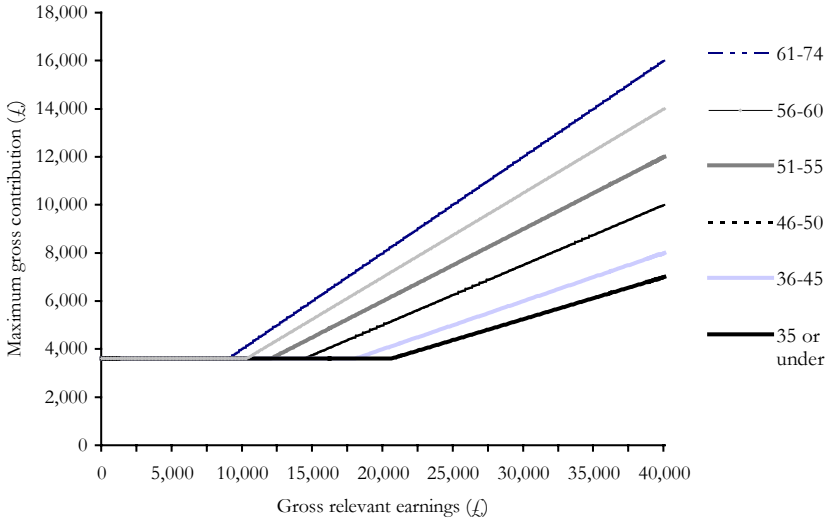
Table 1: Maximum contributions as a % of earnings by age: pre-2001 regime

Age at start of tax year	Maximum contributions as % of earnings
35 or under	17.5%
36-45	20.0%
46-50	25.0%
51-55	30.0%
56-60	35.0%
61-75	40.0%

Notes: Contributions are subject to an overall earnings cap. In 2004-05, this was set at £102,000. Maximum contributions include contributions by both the employer and employee.

However, an important change in the tax regime associated with the introduction of Stakeholder Pensions, applying also thereafter to Personal Pensions, is that *all* individuals, irrespective of any earnings, are able to make gross contributions of up to £3,600 a year (which for a basic-rate taxpayer would require a net contribution of £2,808). Individuals are then allowed higher contributions in line with their earnings as in the previous regime in Table 1. The effect of this change is to raise contributions limits significantly for low earning individuals, especially for younger age groups (since maximum contributions as a proportion of earnings were lower). Figure 6 depicts the effect of the change post-2001 on the maximum gross contribution limits by gross relevant earnings for the various age groups in Table 1. Note that individuals with zero income can also contribute up to the £3,600 maximum, and that the UK's tax system is individual-based so that each individual in a couple can contribute up to this maximum.[2]

Figure 6: Maximum annual gross contribution limit, by annual gross relevant earnings and age, Stakeholder Pension tax regime



[2] Clark and Emmerson (2003) discuss other features of the tax treatment of Stakeholder Pensions, in particular in relation to ISAs. A subsequent, more sweeping, reform to the ceilings on pension contributions introduced in April 2006 was discussed in Section 2.2.

4.4. *Empirical analysis*

This section investigates the determinants of the household decision to save for retirement using information from the Family Resources Survey (FRS). The FRS is a large-scale repeated cross section of households designed to elicit information on household characteristics, income and other economic circumstances. The FRS asks individual respondents who are in work or who have ever worked (below age 65) whether they or their employer contributes to a pension scheme. The pension arrangements are delineated as a 'personal/private' pension, a company-run pension scheme, a stakeholder pension or some other arrangement. Table 2 Panel A provides data from the Family Resources Survey for the (tax) years 1999–2000 to 2002–03 on pension holdings by type. According to the table, overall coverage by private pensions has declined slightly over the period. Coverage by employer-provided plans has been constant, and a decline in coverage by Personal Pensions has been not quite offset by the introduction of Stakeholder Pensions and by a slight rise in the number of people with multiple plans.

Table 2: Pension coverage by type of pension and earnings band 1999/00 to 2002/03

Panel A: Employees only

Year	*1999*	*2000*	*2001*	*2002*	*Δ99-02*
Type of pension:	%	%	%	%	*%point*
Personal Pension	11.3	10.3	9.8	8.4	*- 2.9*
Stakeholder pension	0.0	0.0	0.8	1.2	*+ 1.2*
Occupational pension	47.9	47.9	48.0	48.1	*+ 0.2*
Combined	1.9	2.0	2.2	2.4	*+ 0.4*
Aggregate coverage (%)	*61.2*	*60.2*	*60.7*	*60.2*	*- 1.0*
Sample size	*20,829*	*20,010*	*21,655*	*22,939*	*85,433*

Panel B: All employees of working age

Year	*1999*	*2000*	*2001*	*2002*	*Δ99-02*
Coverage by earnings band	%	%	%	%	*%point*
Zero	3.4	3.6	3.5	3.6	*+ 0.1*
Low	35.0	35.5	36.9	36.6	*+ 1.6*
Medium	69.7	68.7	68.8	67.3	*– 2.4*
High	86.9	86.3	85.7	84.6	*– 2.4*
Aggregate coverage (%)	*44.4*	*44.1*	*44.7*	*44.4*	*0.0*
Sample size	*29,351*	*27,927*	*30,071*	*31,813*	*119,162*

Note: The sample includes individuals between school leaving age and state pension age, although a few individuals have to be excluded due to missing data. The sample in Panel B is that used for the regressions reported in later sections. Rounding explains why figures in the right-hand column may be slightly different from the difference between the 1999 and 2002 columns.
Source: own calculations, Family Resources Survey 1999/00 to 2002/03.

Panel B reveals the striking finding that coverage has fallen among the high and medium earnings groups over the period (these are the bands delineated by the Green Paper, of £18,500+ and £9,000 to £18,500 respectively).[3] Coverage has *risen* among low earners and even (marginally) among those reporting zero earnings who are below state pension age. At first sight, these combined findings from Table 2 are paradoxical given the intentions stated in the Green Paper. They suggest that the introduction of Stakeholder Pensions has had no effect on overall coverage and indeed coverage by any kind of pension has fallen among the 'target' group of middle earners. Nor can these declines be explained by a decline in employed-provided occupational pension provision, since this remains constant. Finally, despite the Green Paper suggesting that low earners might be better off in the second pillar state scheme, this is the only group to see a substantial increase in private pension coverage.

To permit a more formal analysis, we write a model of retirement saving that accounts for the targeting of the reform:

$$Y_{it}^* = \theta' Z_{it} + \pi' d_t + \gamma' X_{it} + \varepsilon_{it} \qquad (1)$$

The dependent variable, Y_{it}^*, is the outcome of the retirement saving decision of individual i at time t and is a latent variable that may be regarded as measuring whether or not an individual gains positive utility benefit from saving in a private pension. Z_{it} is a vector delineating the earnings group ('high', 'medium', 'low' or zero, as described previously) in which the individual i is located at time t; d_t is a vector of time dummies; X_{it} is a vector of covariates; and θ, π and γ are vectors of parameters.

The *observed* outcome variable is whether or not an individual saves in a private pension at a particular point in time. Define this dichotomous outcome as Y_{it} in contrast to Y_{it}^*. With a normally distributed error term, this set-up describes a probit model (the form that we use below). This modelling strategy allows for the discrete nature of our outcome variable and so avoids a possible outcome in a linear probability specification of predictions outside the logically permissible range for probabilities, and in particular of a negative 'probability' of saving in a pension for some in the zero earnings group.

[3] We gross up weekly earnings data to provide these annual earnings bands. This inevitably produces measurement error - for example some people will wrongly be attributed 'zero' earnings for the year based on current zero earnings. In addition, the Green Paper sometimes refers to '£20,000' and sometimes to '£18,500' as the highest income of 'middle earners'. In general we work with the latter definition in the FRS data, revalued over time in line with earnings growth.

The hypothesis that we test in our differences-in-differences exercise is whether the introduction of Stakeholder Pensions had effects on the probability of purchasing a private pension that varied across earnings groups (the effect in the 'target' group of middle earners is especially interesting), with the counterfactual being that in the absence of the reform the purchase probabilities for the different groups would have determined by common trends. If we could estimate the linear relationship (1), then the extent of any differences across groups would be measured by the coefficient on the interaction between earnings group and an indicator variable (I_t) for the period during which Stakeholder Pensions were available (from 2001 onwards): this is the coefficient α in equation (1′).

$$Y_{it}^{*} = \theta' Z_{it} + \pi' d_t + \gamma' X_{it} + \alpha' Z_{it} I_t + \varepsilon_{it} \qquad (1')$$

However, in a non-linear model such as the probit, calculated 'marginal effects' on interaction terms cannot be thought of as giving a difference-in-difference measure analogous to the coefficients from a linear model.[4] As Blundell *et al* (2004) point out, within the set-up for a discrete outcome, the common trends assumption may not hold for the expectations of Y_{it} (the saving probabilities) but for a transformation of the distribution of the outcome variable, and specifically for the inverse probability function.[5] In other words, the assumption of common trends is made for the index rather than for the probability itself.

Blundell *et al* (2004) explain how this common trends assumption can be formalised and used to construct a differences-in-differences estimator.[6] The technique as it applies to the current problem is explained in detail in Chung *et al* (2005), and used to estimate the 'treatment' effects reported in the next sections. These estimated 'treatment' effects are averages across all treated individuals that can be thought of as measuring the average impact of treatment on the treated.

[4] In addition to the points raised here about the common trends assumption, it is also the case that the 'marginal effects' on interaction terms in non-linear models that are automatically generated by software packages (in our case by STATA version 8) often do not give a true measure of 'interaction effects'. For more details see Ai and Norton (2003).

[5] Which is assumed to be known and for the probit is $\Phi^{-1}(\cdot)$.

[6] Although the method is similar to the linear case in its use of a control group in order to predict an unobserved counterfactual, the nonlinearity does require two additional restrictions on the nature of the error terms: only group effects are allowed for and the groups being compared are assumed to have the same residual variance. See Blundell *et al*, *ibid,* p.580.

4.4.1. Econometric results: Model in differences

Before moving to the 'treatment' framework, Table 3 provides a simple model ('in differences') of the probabilities of respondents purchasing any private pension (whether provided by the individual's employer or by an insurer), using data from the Family Resources Survey 1999–2000 to 2002–03. We exclude the self-employed from the sample to reduce the number of interactions, although the results are not thereby altered. The mean probability of purchasing a private pension is 44.4%. The model simply relates this probability of purchase to underlying characteristics and a time trend. A key issue is how this probability varies across the earnings groups (zero, 'low' i.e. >£0 to <£9,000, 'medium' i.e. £9,000 to <£18,500, and 'high' i.e. £18,500+). The marginal effects can be directly interpreted as relating to changing characteristics, given that the model is in differences.

The model shows a rising probability of having a private pension with age up to age 54. Relative to the default group (age less than 25), 25-29 year olds have a 19.3 percentage point (ppt) increased probability of contributing to a private pension, and 30-34 year olds a 31.1ppt increased probability. Thereafter, with rising age, the probabilities remain roughly constant. Men are just under 5ppt less likely to buy pensions, other things being equal (a crucial *caveat*) – this may reflect the longer life time expectancy of women – and a member of a couple is more likely to buy a pension, perhaps again reflecting the possibility of receiving an inherited pension on the death of a spouse or else of self-selection by martial status. As expected, higher educational attainment is associated with greater probability of purchasing a private pension.

The next set of coefficients is of particular interest. First, the year dummies are negative (relative to 1999–2000) and significant for 2002–03 suggesting, on average, a 1.7ppt lower probability of contributing to a private pension in 2002–03 relative to 1999–2000. This reflects the downward trend noted in Table 2 although only the fall in the last year is statistically significant at conventional levels. Second, Table 3 shows, as might be expected, that the level of earnings is an important predictor of purchase of a private pension: relative to the high earnings group, a middle earner is 15ppt less likely, a low earner 39ppt less likely and a zero earner 67ppt likely to purchase a private pension. Again, these marginal effects can be compared with the comparisons of averages in Table 2. Finally, the higher the partner's earnings, the more likely that the individual will purchase a private pension.

Table 3: Probability of having a private pension: Model in differences

Variable	*Coeff.*	*DF/dx*	*Std.Err.*
Age 25-29	0.493**	0.193	0.020
Age 30-34	0.800**	0.311	0.020
Age 35-39	0.904**	0.349	0.019
Age 40-44	0.949**	0.365	0.020
Age 45-49	1.025**	0.391	0.021
Age 50-54	1.011**	0.386	0.021
Age 55-59	0.926**	0.356	0.022
Age ≥60	0.743**	0.290	0.030
Male	–0.047**	–0.017	0.010
Couple	0.155**	0.058	0.011
GSCE or below	–0.300**	–0.114	0.012
'A' Level or below	–0.083**	–0.031	0.013
Year=2000	–0.017	–0.006	0.013
Year=2001	–0.012	–0.005	0.013
Year=2002	–0.045**	–0.017	0.012
Zero Earnings	–2.740**	–0.664	0.019
Low earnings	–1.240**	–0.390	0.016
Mid earnings	–0.412**	–0.153	0.015
Partner's earnings	0.003**	0.001	0.0003
Log Likelihood	–52,619.4		
No. of obs.	119,162		

Notes: Source – Family Resources Survey. Defaults are graduate aged under 25, female, single, year 1999–2000 with high earnings. ** = 1% significance, *=5% significance. Coefficient on constant omitted. dF/dx coefficients can be interpreted as 'marginal (policy) effects' – see text.

4.4.2. Econometric results: Model in 'Quasi-difference-in-differences'

We now move to the 'treatment' model, the results of which are reported in Table 4. The results are labelled 'Quasi-difference-in-differences' because they use the introduction of Stakeholder Pensions as the 'treatment', as summarised in text equation (1'). Estimating (1') allows us to compare coefficients with those from the 'model in differences' in Table 3, and also gives a fuller impression of whether there are important differences across earnings groups.

Column (1) provides the coefficients from the model described in text equation (1'). Coefficients on characteristics in the 'difference-in-differences' specification are broadly the same as before, although those attached to earnings level are slightly larger in magnitude. It is also interesting to notice that the year effects become more strongly negative for 2001 and 2002, and both are now highly significant whereas this was only true for the later year in the model in differences in Table 3. This reflects the fact that with the interaction terms included these coefficients are driven by the decline in

coverage amongst high earners (the omitted earnings group), and we have seen that this group had a relatively large decline in coverage (see Table 2).

Table 4: Probability of having a private pension: Quasi-difference-in-differences

	(1) *Own earnings band*		(2) *Own+spouse's band*	
Variable	*Coeff.*	*Std.Err.*	*Coeff.*	*Std.Err.*
Age 25-29	0.493**	0.020	0.486**	0.020
Age 30-34	0.799**	0.020	0.797**	0.020
Age 35-39	0.904**	0.019	0.906**	0.020
Age 40-44	0.949**	0.020	0.951**	0.020
Age 45-49	1.025**	0.021	1.029**	0.021
Age 50-54	1.011**	0.021	1.022**	0.021
Age 55-59	0.926**	0.022	0.945**	0.022
Age ≥60	0.742**	0.030	0.767**	0.030
Male	–0.048**	0.010	–0.015	0.010
Couple	0.155**	0.011	0.091**	0.012
GSCE or below	–0.300**	0.012	–0.295**	0.012
'A' Level or below	–0.083**	0.013	–0.083**	0.014
Year=2000	–0.017	0.013	–0.016	0.013
Year=2001	–0.079**	0.026	–0.071*	0.032
Year=2002	–0.111**	0.026	–0.105**	0.031
Zero Earnings	–2.783**	0.027	–2.780**	0.032
Low earnings	–1.303**	0.023	–1.313**	0.028
Mid earnings	–0.440**	0.021	–0.474**	0.025
Partner's earnings M/H	0.003**	0.0003	0.098**	0.039
Zero E*StakePen	0.080*	0.036	0.051	0.044
Low E*StakePen	0.120**	0.029	0.081*	0.036
Mid E*StakePen	0.040	0.028	0.031	0.034
Zero E*Partner's earnings M/H	-	-	0.088	0.057
Low E*Partner's earnings M/H	-	-	0.030	0.045
Mid E*Partner's earnings M/H	-	-	0.102*	0.044
StakePen* Partner's earnings M/H	-	-	–0.015	0.052
Zero E*StakePen*Partner's earnings M/H	-	-	0.077	0.079
Low E*StakePen*Partner's earnings M/H	-	-	0.093	0.061
Mid E*StakePen*Partner's earnings M/H	-	-	0.020	0.060
Log Likelihood	–52,607.6		–52,503.7	
No. of obs.	119,162		119,162	

Notes: Source – Family Resources Survey; Defaults are graduate aged 20-24, female, single, year 1999–2000 with high earnings, partner has zero or low earnings. Coefficient on constant omitted.
** = 1% significance, *=5% significance.
'Zero E*StakePen' = individuals with zero earnings interacted with a dummy for the Stakeholder pension 'regime' (post April 2001). 'Zero E*Partner's earnings M/H' = individuals with zero earnings interacted with dummy for whether spouse had medium or high earnings. Other interactions have similar interpretations.

Inspection of the 'treatment' coefficients – the interaction of earnings level with the dummy variable identifying the years after Stakeholder Pensions were introduced – would suggest that the policy had no significant impact on coverage among middle earners. In contrast, the coefficients for the analogous interaction terms for low earners and zero earners are significant (at 1% and 5% levels respectively) and suggestive of effects offsetting the negative time trend.

As suggested in Section 4.3, the 'true' treatment effects of the introduction of Stakeholder Pensions cannot be 'read off' from the marginal effects that would be associated with these reported coefficients. Using the Blundell *et al* (2004) procedure described in that sub-section, these effects can be calculated as:

zero earnings group:	0.3ppt (0.4ppt)
low earnings group:	3.6ppt (1.7ppt)*
middle earnings group:	1.6ppt (1.1ppt)

('*' indicates significance at the 5% level; *standard errors in brackets, estimated by bootstrapping with 1,000 repetitions*).

These results indicate that the largest and most significant impact of Stakeholder Pensions relative to trend (of around 3.6 percentage points) has been on low earners. The impact of the reform on those with zero earnings was overstated by the standard errors in Table 4, and we also find no significant effect on middle earners. Thus the results effectively confirm the descriptive patterns in the second panel of Table 2.

4.4.3. Further analysis: the role of spouse's earnings

The results so far are inconsistent with the 'targets' in the Green Paper – the aggregate comparisons in Table 2 and the results in Tables 3 and 4 column (1) suggest that low and even zero earners may have increased the take-up of private pensions after the reform, although overall coverage remains very low for this last group and the calculations of the 'true' difference-in-differences estimator using the Blundell *et al* 2004 calculation and formulation of common trends also casts some doubt on the zero earner finding. Nevertheless, *any* finding, however tentative which suggests that people with zero or low earnings increasingly took out private pensions is somewhat surprising (unless they have substantial unearned income).

The result becomes less surprising when we consider the fact that *each* individual in a household can invest up to the ceiling in a Stakeholder Pension, irrespective of their own income. The results are consistent with the idea that some low earners in the

household have taken out Stakeholder Pensions because the household was previously constrained by the effective limit on the value of retirement saving arising from the contribution ceiling (see Figure 6). Thus the replacement of the cap as a proportion of earnings by the single figure (£3,600) may lie behind this change. So, for example, a spouse with low or even zero earnings can invest up to the limit in a Stakeholder or Personal Pension if there are sufficient resources in the household as a whole. If pensions are simply used by the household as a device for engaging in relatively tax-favoured saving this might be seen as an undesirable by-product of the reform. On the other hand, it could be argued that a policy that, for example, redistributed pension resources from a rich partner to a spouse with low lifetime individual income was socially desirable (a point recognised in the quote from the Green Paper in Section 4.1). This also generates a specific testable prediction: if we include spouse's earnings among the explanatory variables, the probability of a low (or zero) earner contributing to a pension in the Stakeholder Pension regime should be *positively* related to the spouse's earnings.

The model where we allow for spouses' earnings is written as:

$$Y_{it}^{*} = \theta' Z_{it} + \tau' S_{it} + \pi' d_t + \gamma' X_{it} + \alpha' Z_{it} I_t + \beta S_{it} I_t + \lambda Z_{it} S_{it} + \varphi Z_{it} S_{it} I_t + \varepsilon_{it} \qquad (2)$$

where all variables are defined as before except S which is an indicator variable of the income band of the spouse of individual i at time t. We are now interested not just in the coefficient vector α but also in the coefficients ϕ which measure the impact of the spouse's income band on the retirement saving probability of an individual in a given income band. Again, we use the Blundell *et al* method to calculate the 'treatment' effects for this more complex specification. However, because we now have many more interactions, we simplify the modelling of partner's earnings so that these are either Zero/Low (i.e. below £9,000) or Medium/High (i.e. £9,000 and above). This coarser grouping seems reasonable as it differentiates inactive or low paid spouses (e.g. part-time workers) from full-time or better paid working spouses. However, we maintain the four - way distinction for individual earnings.

Table 4 column (2) presents the results. Most of the coefficients on characteristics are similar to the estimates in column (1). The coefficient on sex is no longer significant, now that we have allowed for interactions of partner's earnings and each individual's own earnings band. The year dummies have slightly lower coefficients but still suggest a significant downward trend in the aggregate probability of purchasing a private pension over time.

The coefficients on the interactions are of most interest, although few are now individually significant. For example, only the low earnings 'treatment' (interaction with the dummy identifying the post-stakeholder period) is significant, confirming that the effect on non-earners is not very robust, at least without consideration of partner's earnings. To interpret the coefficients on the interactions, we carry out joint tests of significance for each of the (Z_i) earnings groups in turn. For each group, we test the joint significance of the pair of coefficients:

"(Z_i =X) * After stakeholder" and

"(Z_i =X) * After * Partner mid/high earnings"

The null hypothesis is that the pair of coefficients is jointly zero. Our results are:

For Z_i = zero earnings, rejects null at 10% level, p-stat 0.0725.
For Z_i = low earnings, rejects null at all conventional levels, p-stat 0.0001.
For Z_i = mid earnings, *cannot* reject null at conventional levels, p-stat 0.4004.

The results suggest that it is low earners with partners with middle/high earnings and, rather less robustly, zero earners with similar partners, who were affected by the reform. Middle earners were unaffected. We can identify whether there are significant 'treatment' effects using the Blundell *et al.* (2004) procedure described previously.

These additional 'treatment' effects for being in the post-stakeholder period and including spouse's earnings brackets are as follows:

zero earnings group with zero/low earning partner:	0.1ppt (0.3ptt)
zero earnings group with medium/high earning partner:	1.1ppt (0.8ppt)
low earnings group with zero/low earning partner:	2.6ppt (1.6ppt)
low earnings group with medium/high earning partner:	5.2ppt (2.3ppt)*
medium earnings group with zero/low earning partner:	1.7ppt (1.3ppt)
medium earnings group with medium/high earning partner:	1.4ppt (1.4ppt)

('*' indicates significance at the 5% level; *standard errors in brackets, estimated by bootstrapping with 1,000 repetitions*).

This result confirms that the impact of the introduction of Stakeholder Pensions is strongest amongst low earners who have a high or medium earning partner, suggesting that the change to the contribution limits has allowed families with higher joint earnings to utilise the new arrangements to increase the tax-relieved component of their retirement saving. This is most likely to explain the increase in coverage among this group of earners. Without this impact, the analysis suggests, coverage by private pensions

would have declined even more after 2001.[7] In fact, when we formally test the model explicitly on whether pension coverage is affected by whether the household's contribution limits have changed as a result of the 2001 change in tax reliefs, this is exactly the result that we obtained (Chung *et al*, 2005).

4.4.4. Alternative explanations, and interpretation

The key assumption in a differences-in-differences approach is the 'common trend' assumption – here, that in the absence of the policy reform, the trends among the earnings groups' coverage would have been identical. First, we can ask whether there is any reason to believe that the behaviour of high earners (who we assumed to be the 'control' given their existing high coverage by private pensions) would have been different from other earnings groups. There is no other significant policy reform that is pertinent here, such as a change in the structure of marginal tax rates. Perhaps of more pertinence in explaining falling overall pension coverage by pension schemes (Table 2) is the change in the financial climate from the beginning of 1998 to the end of 2002, during which the FTSE 100 fell by 31% whereas house prices rose by almost exactly 50% (using the Halifax plc index). This might have induced savers to switch away from pension funds (which were at this stage largely equity-dominated) to investment in housing stocks. So if high earners exhibited greater substitutability in their asset portfolios, either from economies of scale or greater financial acumen, this might explain the disparate trends. However such a 'story' finds it hard to explain similar trends in pension coverage among high and middle earners, especially with the results when we include the spouse interactions.

Alternatively, we can focus not on the control group but on the group for which the 'treatment effect' is most marked: low earners. Here there *is* an important change in the tax and benefit regime that coincides with the introduction of Stakeholder Pensions from April 2001. As described briefly in Section 4.1, the period saw the replacement of SERPS, the second tier pension, by the State Second Pension (S2P – introduced in April 2002 but announced in the 1998 Green Paper). S2P is more explicitly redistributive towards low lifetime earners in its design. In addition the means-tested benefit for pensioners, known as the Minimum Income Guarantee (MIG), was consistently indexed to earnings rather than prices throughout the late 1990s and early 2000s (unlike the rest

[7] When we split our 'control' (high earning) group into those with partners with medium/high *versus* low/zero earnings, this general result holds in terms of coefficient values, although the additional regressors raise the overall standard errors of the estimates.

of the pension programme), so increasing its real value for low earners and reinforcing the disincentive to save for retirement. In a final important development (albeit one that came in effect *after* the data used in the analysis above, which was from the four financial years from 1999–2000 to 2002–03), the MIG was renamed the 'Pension Credit Guarantee' (PCG) in October 2003, and a new 'Pension Credit Savings Credit' introduced for families containing an individual aged 65 or over. This last reform essentially reduced the withdrawal rate from 100p to 40p in the pound for families with an individual aged 65 or over who was in receipt of a full Basic State Pension but thereby increased dramatically the coverage of means-tested benefits among the pensioner population. Analysis of all these trends suggests that, whereas replacement rates cohort-by-cohort for the public pension programme have already peaked for average earners, low earners are likely to see increasingly generous replacement rates from the public programme for several decades yet (Disney and Emmerson, 2005).

This analysis suggests that, if anything, we might expect coverage among low earners (at least, for those who understood the implications of all these reforms) to fall *faster* than that for high and middle earners. In fact, we have found the reverse, suggesting that our estimate of the 'treatment effect' may if anything be a lower bound on the effect. Moreover, this interpretation does not explain the result for low earners who have a high or middle earning partner, who might not be eligible for income-tested benefits (levied on a household basis rather than an individual basis). Overall, we believe that the 'story' adduced in this paper for the 'treatment effect' is the most plausible one.

To summarise that story, our differences-in-differences estimates suggest that a 'no change' result for the aggregate pension coverage conceals differences across households that, given the nature of the reform package, are consistent with the standard economic model. In particular, a general decline in pension coverage has been offset by an increase in coverage among lower earners. That this increase has not been among middle earners – the heralded target group for the stakeholder pension reform – is not surprising given evidence on pension coverage and other characteristics in this group prior to the reform (see section 4.2). That lower earners seem to have responded also should not be a surprise once one realises that the reforms to tax reliefs that accompanied the introduction of stakeholder pensions mainly affected those with low and zero earnings, and given that we know (not least from experience of the personal pensions episode) that individuals do respond to such incentives.

5. Conclusions

Our starting point was the policy debate concerning the best ways of encouraging people to save for their retirement. Personal Pensions were introduced from April 1988 as a means of encouraging opting-out of the social security programme and to encourage labour market flexibility. Stakeholder Pensions, introduced from April 2001, were targeted by the government on middle earners as a means of filling a perceived gap in retirement saving products. The introduction of Stakeholder Pensions was also associated with a less publicised change in the contribution limits that allowed lower earners to make larger contributions to retirement saving schemes. Our analysis represents the first systematic attempt, to our knowledge, to examine the whole trajectory of these recent policy developments on the probability of households engaging in retirement saving.

Aggregate data suggest that the introduction of Personal Pensions had a massive effect on the extent of private pension take-up, whereas Stakeholder Pensions had little impact on the overall propensity to save for retirement. Dissatisfaction with the outcomes from both reforms, for different reasons, have led policy-makers and analysts to question whether these behavioural responses were consistent with 'rational' life-cycle saving behaviour. Accompanied by qualitative evidence that cast doubt on individual's cognitive abilities, this provided a rationale for the move towards greater compulsion of retirement saving in the policy proposals of the mid-2000s.

Our analysis of these two major reforms, exploiting the evidence on household behaviour and the differential incentives that applied to various household types, suggests a rather different story. The Personal Pension contracting-out regime initially offered an enormous incentive to young people to purchase Approved Personal Pensions, as demonstrated in Section 3 and this is exactly mirrored in the distributions of optants for APPs by age. Once the contracting-out regime was changed more fully to reflect the differential incentives between groups, this disproportionate response disappeared. The extent of the response was not forecast, perhaps because the relevant authorities had a view of the world that perceived young people as unresponsive to pension incentives. Net (public and private) saving in Personal Pensions was minimal in these early years but this is not surprising given that the government was effectively giving new optants around 8% of their earnings to put in these accounts. Once the government tightened up the contracting-out regime, the demand for Personal Pensions

lessened but it does appear that saving rates among remaining optants increased (Disney, Emmerson and Wakefield, 2001). All of this is consistent with standard economic theory.

Coming to Stakeholder Pensions, the 'story' is different. The 'headline' target of the policy was middle earners but we can find no evidence that the reform affected pension take-up rates among this group. Arguably, this not surprising since Stakeholder Pensions offered no specific new incentive to this group. It was the associated change in contribution tax limits that offered differential incentives. It appears from our analysis that, as with the Personal Pension reform, individuals (or their financial advisors) did indeed perceive the incentives implicit in the reform of tax reliefs and responded accordingly – with greater take-up of pension accounts in households exploiting the raising of the relief threshold for zero and low earners, including those with higher earning spouses. Again the pattern of responses to incentives is consistent with the standard economic model.

Our overall conclusion is that changes in the availability of saving instruments and tax incentives *do* affect saving behaviour – a result incidentally confirming much of the US literature on the impact of contribution limits on saving in Individual Retirement Accounts (see again Journal of Economic Perspectives, 1996, and the literature cited therein, and also Attanasio and DeLeire, 2002). However, the episodes we have considered also show that it is important to look at the detail (in these cases, the consequences of rebate structures and tax reliefs) when attempting to understand how a policy might work in practice or when evaluating it after the event.

The fact that the saving behaviour of individuals is responsive to policy changes also suggests erring on the side of caution when designing reforms to the pension saving regime. This is not only because dramatic reforms with implications that are not fully understood may lead to large responses beyond the scope of the aims of the policy (one interpretation of the initial rebates associated with the personal pension reform), but also because repeated large reforms are hardly conducive to the institutional stability that must help individuals who, we have seen, are forward looking when they plan their retirement saving. An assessment of whether the latest two major sets of pension reforms in the UK – one enacted in April 2006 and the next proposed in May 2006 (see Department of Work and Pensions, 2006) – are consistent with this advice or further

examples that "…the political process is not equivalent to a consistent approach to policy over time" (Diamond, 2004), lies outside the scope of this paper.

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Working Paper List 2005

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